Appendix K
Michigan/1

The Michigan/1 Vision

Michigan/1 is a vision for the baseline structure of the State government's computing environment. It is an effort to consolidate 19 different computing environments into a standardized enterprise framework. The resulting benefits are to reduce the number of systems supporting basic computing functions, such as directory services, file and print environments, and desktop environments, which will result in reduced costs and improved levels of service to the Agencies.

Our current environment consists of a multitude of desktop computer and server environments, with little to no cross-agency consistency in configuration, support models or processes, resulting in an inability to leverage technical resources between and across Agency boundaries. Figure 1 below depicts the "as is" situation.

Technology Infrastructure "as is"

55,000+ Desktops	2,000+ Data Lines	2,400+ Dist. Servers	22+ Computer Rooms
- Variety of operating systems and platforms - Multiple office automation software suites in use - End user support varies by agency - 32 support infrastructures	- Duplicate low-speed data lines to same locations - Separately managed agency-specific LAN infrastructures	- 83 separate locations in Lansing area - 728+ out-state locations - Various operating systems (i.e. Unix, NT, Mac, Novell, etc.) - Multiple e-mail application suites	- Several leased facilities - Inconsistent environment controls - Limited disaster recovery and business resumption capabilities - Security varies by Location

Figure 1 – "As is" infrastructure

The Michigan Department of Information Technology (DIT) was formed to mitigate the issues associated with the autonomy and diverse directions pursued by the individual departments and agencies when implementing information technology initiatives. Michigan/1 is one of the DIT efforts toward achieving this objective. By establishing the framework for the utility computing environment through desktop standardization, messaging consolidation, an integrated and scalable directory service for providing authentication, and a standardized file and print environment DIT has developed the basis for the ability to leverage equipment, people, processes and tools.

The overall purpose of Michigan/1 is to set direction. Technical architecture standards will guide us toward operational effectiveness and efficiency. While Michigan/1 is not an answer to all of our infrastructure complexities, it is about (a) creating order around what we currently have, and (b) establishing a roadmap for future initiatives. Michigan/1 is not a "net new" architecture, nor will it encompass a "forklift" upgrade. As systems are refreshed or new systems are put in place, they will be done so with the Michigan/1 vision as the guiding principle.

As in any environment there will be some projects or systems that will not be able to comply with the overall direction. For Michigan/1 an exception process will be established to assist with business case justifications for projects that fall within the realm of Michigan/1 but cannot comply with its architecture. By establishing an exception process DIT will partner with its Agency clients to blend the need for a consistent architecture with the need to accommodate specific business requirements.

The components of Michigan/1 are:

- Desktop standardization
- Directory consolidation
- Messaging consolidation
- Server centralization and/or consolidation
- Enterprise monitoring and management

Each component has a framework, and most components rely on one or more other components – thus the need to look at and approach the initiatives as an integrated program.

Desktop Standardization

The objective of desktop standardization is to implement a state-wise standardized desktop platform with a consolidated desktop support environment. Desktop standardization will provide a Microsoft Windows XP base image with an Agency-specific layer of software and other software packages as authorized. Also included in desktop standardization are anti-virus tools and management, patch management and remote control for technical support of the desktop environment. The overall framework for desktop standardization and desktop management is called the Michigan Workstation Management System, which is comprised of a combination of in-house developed and off the shelf tools (see Figure 2 below).

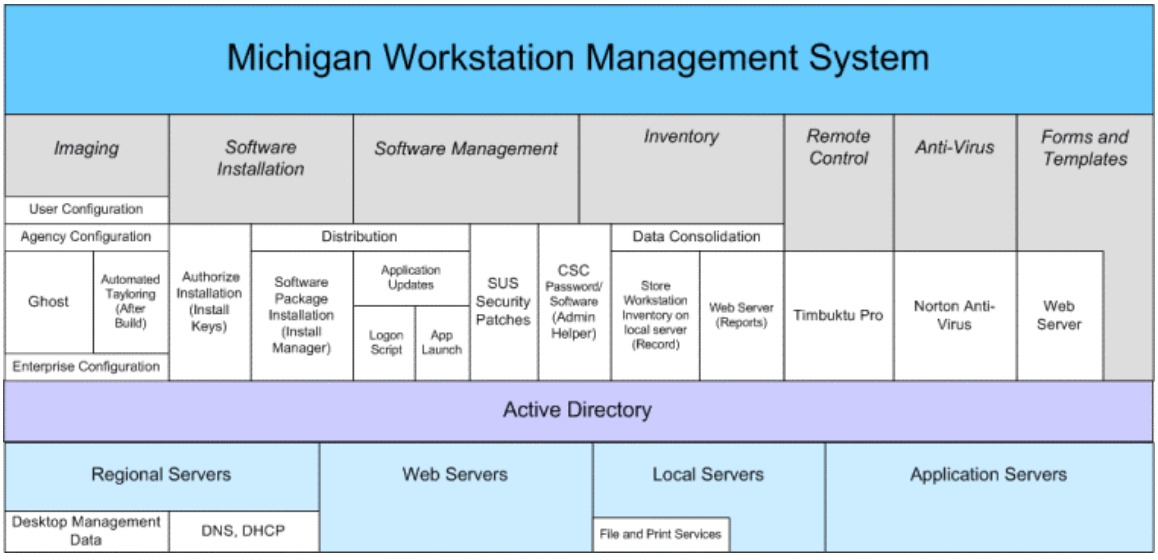

Figure 2 – Michigan Workstation Management System

Desktop standardization relies on Active Directory for workstation management. It also relies on servers and storage for software distribution and patch management.

Directory Consolidation

By performing Directory Services consolidation we will simplify the State's directory infrastructure. Specifically the objectives are to:

- Reduce costs by providing a manageable number of scalable, hierarchical repositories
- Reduce the number of servers providing directory and name services (DNS, DHCP, WINS)
- Provide flexible authentication and consistent authorization
- Provide centralized, role-based administration

In addition, Directory Services Consolidation will provide the supporting infrastructure for the Michigan Workstation Management System (under Desktop Standardization), provide a consistent directory structure for application integration, and form the basis for a service directory to support identity management and provisioning.

Messaging Consolidation

The State of Michigan will support two messaging systems: GroupWise and Exchange. Currently there are hundreds of servers running differing versions of messaging software on aging platforms. The Messaging Consolidation will combine all of the separate GroupWise implementations onto a single shared GroupWise system and all of the separate Exchange implementations onto a single shared Exchange system, providing high availability and consistency in the supporting infrastructure. Figure 3 exemplifies the current messaging infrastructure.

Messaging Consolidation Current Environment

	GroupWise	**Exchange**
Number of Users	App. 45,000	App. 5,000
Hardware Status	Mostly aging hardware	Varying
Functional Distribution	700 servers, majority share file and print	Centralized servers dedicated to messaging
Operating Systems	Varying OS & GW versions	Consistent versions
Retention and Archive	Varying policies	Varying policies
Quota Restrictions	Varying policies	Varying policies
Backup Policies	Inconsistent	Centralized backup
User ID Administration	Messaging admin function	Messaging admin function
Address Book Design	Some consolidation	Consolidated
Mobile Device Handling	Inadequate	Inadequate

Figure 3 – current messaging environment

The benefits of these consolidations are:

- Reduced risk of messaging infrastructure equipment failure, increasing availability and increasing the ability to recover from incidents
- Reduced complexity in troubleshooting and maintenance
- Consistent backup and disaster recovery systems
- Messaging Consolidation will result in significant Server Consolidation
- Fewer points of failure due to fewer servers
- Fewer servers also results in reduced hardware and software costs
- Reduced downtime and reduced Client Service Center calls
- The ability to handle a higher volume of messaging
- Outbound internet mail scanning for e-mail viruses

- The ability to implement spam filtering
- A single point of administration for GroupWise and a single point of administration for Exchange
- A single address book for GroupWise and a single address book for Exchange
- Simplified budgeting resulting from centralizing the service

Server Centralization and Consolidation

Server centralization and consolidation will occur in a number of areas both as a result of other consolidation efforts (Directory Consolidation and Messaging Consolidation) and as a result of a push toward consolidation of file services and centralization of application servers.

The objectives of server centralization and consolidation are to reduce the number of Intel-based server platforms, locate critical systems in secure data centers, leverage technology investments, consolidate platforms where possible, set and adopt platform and configuration standards, and to implement automated management.

The benefits of Server Consolidation are to:

- Reduce the components necessary to support the IT environment (such as raised floor, network connections, power/PDU/UPS, air conditioning)
- Reduce the different types of platforms (servers, SANS, backup systems) and number of configurations
- Enhance subject matter expertise and leverage skillsets
- Locate support staff closer to critical systems
- Reduce the number of servers and maintenance contracts
- Reduce operational and procurement costs
- Reduce management complexity

The soft benefits of server consolidation include:

- The ability to meet unexpected need (core infrastructure design, scalable capacity)
- Faster and more efficient implementation (design templates, configuration templates)
- More reliable platforms, resulting in increased availability
- Better use of resources: hardware, software and people

Enterprise Monitoring

The objective of enterprise monitoring is to implement an enterprise-wide system that would centralize 7 x 24 infrastructure monitoring in a concentrated effort to improve infrastructure stability, bring monitoring to a baseline (preserving existing advanced services where they exist), support incident and problem management, reduce operating costs and provide a basis for service level metrics.

Under enterprise monitoring DIT would implement network node monitoring systems, establish a centralized view of the infrastructure, generate a discovered objects database, provide server metrics reports, and create service management and application status dashboard views.

The benefits of enterprise monitoring are to provide, at minimal cost, an expansion of the use of existing tools consistently implemented to better service all DIT customers, to eliminate duplicated efforts, and to provide the basis for DIT-wide minimum level of system monitoring that will enable more timely response to problems.

The Michigan/1 Approach

The Michigan/1 process approach begins with DIT-developed fundamentals…

- Ensure DIT-wide acceptance by utilizing a cross-functional governance board, establishing Executive Sponsorship
- Adhere to strategic planning and architecture guidelines
- Provide for change by implementing change management
- Measure and report progress, provide for issues escalation
- Communicate, communicate, communicate

Individual projects will be implemented on a push, pull, or standards and policy basis as indicated in the Michigan/1 Roadmap to Establishing the Enterprise Infrastructure – see the snapshot below and refer to the document titled Michigan/1 Roadmap.

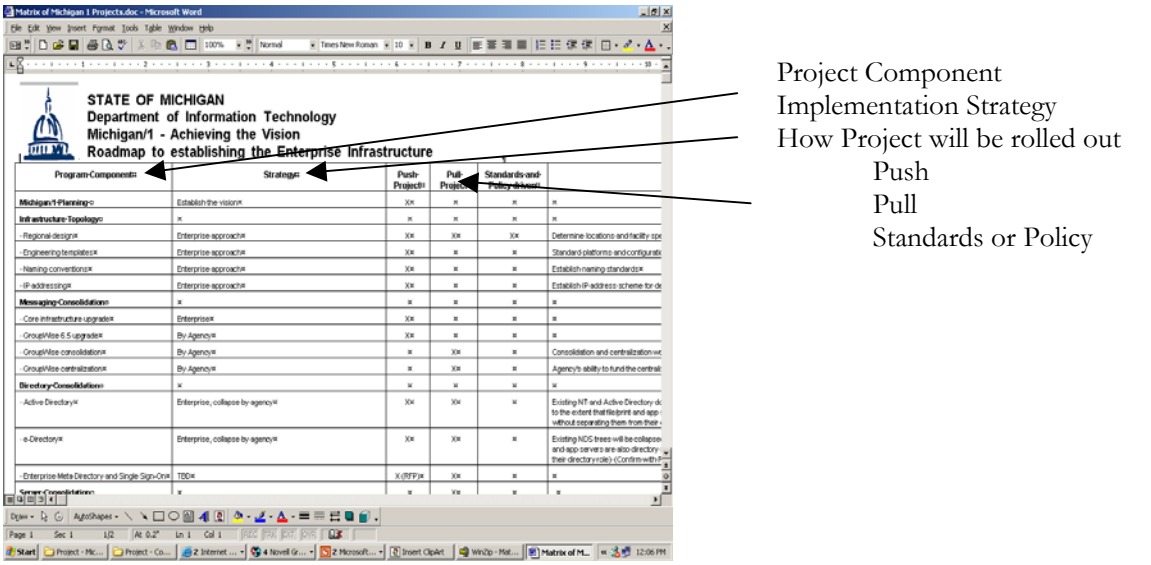

Figure 4 – Michigan/1 Roadmap

Push projects

Push projects are those that DIT is driving – in terms of scheduling, prioritization, and assigning resources – DIT is taking the reigns and getting them done. They are elemental phases that must be in place to begin other phases. Some of the push projects are enterprise in nature – in that they provide a basic shared service used by all Agencies. The Messaging Core Infrastructure Upgrade is an example of this – all agencies make use of the SMTP gateways for internet email, the GroupWise/Exchange connectors that allow messages and appointments to flow between Agencies with different email systems and the LDAP directories that point inbound internet email to the appropriate gateways.

Most push projects are low-cost or no-cost projects in terms of actual cash outlay. They consume DIT technical resources, so there is an opportunity cost for the time spent on the push project that could be spent on other projects or operational functions, but overall there is no real budget impact.

Pull projects

Pull projects are dependent on Agency funding. Thus they are dependent on the Agency prioritizing the project as something they need done, and they are dependent on the Agency's timing or schedule. While the project will be performed using the DIT-developed project task lists and many DIT resources, the Agency is in the driver's seat in terms of when the project is actually performed.

For instance, desktop standardization will occur when an Agency is ready to refresh its desktops. In some cases the desktop standardization requires PC or memory upgrades, thus the expense could be substantial and it may not happen for the whole Agency at once. But when the Agency does decide they want to move to Windows XP, they will do it within the Michigan Workstation Management System framework and DIT will use its pre-defined process for rolling out the desktop.

In many cases an Agency will want to combine and coordinate the components to achieve a goal. An example of this is in one of our largest Agencies that will be combining messaging consolidation/centralization with a file server consolidation in order to be able to remove 180+ past-useful-life (dying on the vine) servers from production. This will be done at the same time they are rolling out Windows XP, establishing directory authentication to Active Directory. Recognizing the value of the ideas behind Michigan/1 when it was presented to them, it was a real business win to replace 180 servers with fewer than 40 servers.

Standards and Policy-based projects

Standards and policy driven projects often go hand-in-hand with pull projects. DIT will establish standards and policies based on the Michigan/1 vision. For example, it will be a DIT policy that all new applications defined as "critical" by an Agency will be on servers in Hosting Centers where there are sufficient facilities and operational processes in place to support them in the manner that the "critical" designation implies… monitored environmental conditions; operating system, application and data backups; documented disaster recovery plans that are systematically tested; and sufficient resources (hardware, software and technical personnel) to bring the system back up within 24 hours in the event of an incident.

It will be DIT policy that new applications will be placed in the Hosting Centers where they can be monitored and supported by Incident, Problem and Change Management processes. They will be placed on standard hardware platforms built with standard configurations.

Likewise, it will be DIT policy to migrate file services to a standard NAS platform at such time as an Agency requires a technology refresh on file servers. And, it will be DIT policy that all systems in the Hosting Centers, which by default have certain service level expectations, and enterprise systems (directory servers, messaging systems, SAN, NAS) will be monitored.

By laying out this vision and providing the push, pull and standards/policy roadmap, over time a enterprise architecture will be achieved.

Summary

As a program, Michigan/1 is the largest set of initiatives DIT has set out to implement. Because of the interdependencies in the components, the only logical way to approach them is as a tightly integrated set. By doing so the results of Michigan/1 will be:

- Achievement of a leveraged environment by establishing standards and common Infrastructure Services
- Improved service levels to customers

- Movement toward fully rated services
- The opportunity to absorb growth without increasing resources
- A seamless operating environment enabling business continuity across the enterprise